

Abstract of the Disclosure

An integrated photonic device having a vertical optical connection between vertically oriented waveguides and a process for making the same is disclosed. A first
5 waveguide is patterned and etched onto an underlying substrate. A cladding layer is placed over the waveguide and substrate. The cladding layer is coated with a photoresist, and then patterned with holes that are slightly offset from the underlying waveguide. The holes are implanted with nitrogen doses at an angle. The nitrogen doses form an angled implantation of SiON. The material change and accompanying index of refraction
10 change due to the angled implantation optically couples the underlying waveguide with an outside surface of the cladding layer. A second waveguide or circuit can then be patterned on the outer surface of the cladding and connected to the angled implantation and underlying waveguide. Multiple layers of waveguides or circuitry can be connected to each other in this manner.